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T he Effects of Loose Parts and Nature-Based Play on Creativity in the Montessori Early Childhood (3-6 year old) Classroom

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An Action Research Report

By Leah Yavuz

Abstract

The purpose of this research was to determine if the addition of natural loose parts, or manipulatives, to the outdoor play yard would increase creativity in the classroom. This study took place in a private Montessori school with 14 children ages 3 to 6 years old over a five-week period. Various methods were used to gather information to determine any change in creativity. Observations of creative behaviors, concentration (state of flow), and spontaneous collaboration were collected as well as drawing tests for creative thinking, and samples of creative writing and artwork. The results of the study found that the loose parts did not increase creativity in the classroom. However, the addition of the loose parts did correlate with an increase in collaboration, imaginative play and a possible increase in concentration. Suggestions for further research include extending the amount of time the study took place, and focusing on one age rather than a mixed aged grouping.

In a Montessori classroom for ages 3 – 6, creativity is cultivated through children's inquisitive discovery and exploration. Children are given means to design artwork, write creatively, and think divergently. Even with all of the available creative outlets, there are times in an early childhood setting where children resort to copying each other's artwork and writing. When asked questions, children often repeat stories they hear their friends say without truly thinking with their own divergent, creative thoughts. This action research explores the addition of various tools in hopes of boosting divergent thinking in the Montessori classroom. These tools include nature-based manipulatives that children can build, move, and use their imaginations to change.

The research was conducted in a small, private, Montessori school with 14 children attending. The classroom is a mixed-age grouping of 3 – 6 year olds with six boys and eight girls as participants. The school is located in a suburban town on a main road. The backyard area is a grassy fenced-in yard with a few trees. The playground is a standard tree house style with three swings, a small rock-climbing wall, a slide, and a hanging bar.

Literature Review

Creativity is an abstract, broad term usually assumed to be related to the arts. However, when examining the research, creativity has varying definitions with one underlying constant. The National Curriculum for schools in England has defined creativity as the ability to "generate and extend ideas, suggest hypotheses, apply imagination, and look for alternative, innovative outcomes" (Shaheen, 2010, p. 168). The authors Cho and Kim (1999) wrote that creativity may be indicated by "curiosity, flexibility, originality, and insight" (p. 337). Similarly, in a study by Russ and Wallace

(2013), they identified creativity as divergent thinking and flexibility (p. 137). When examining a common thread, originality is the dominant factor. In fact, a test for divergent thinking predicted creative achievement in adults 40 years later (Russ & Wallace, 2013, p. 140). The ability for children to think outside the box in unconventional ways, spurred by imagination, is the core of trying to define such a complex term as creativity.

An educational psychologist, Kyung Hee Kim (2012), found that creative thinking in American kindergarteners through third grade is declining (p. 293). This decline is disheartening considering divergent thinking is imperative to the changing workforce of the 21st century. Children will need to acquire strong skills in creative thinking to adapt to jobs that have not even been created yet (Powell, 2009, p. 20). President Obama has said he wants to "ensure that American children again lead the world in achievement, creativity, and success" (Powell, 2009, p.18). David Elkind (2007) wrote that creativity and imagination are required for higher level thinking jobs, specifically in mathematics and science. In 2012, America ranked 35th in math and 27th in science out of 67 countries (Desilver, 2015). If America is to improve in mathematics and science rankings, creativity will need to be strengthened. It is clear that creativity needs to be encouraged for young children to succeed in the future workforce as Elkind and Powell have discussed. This literature review examines the many ways creativity may be strengthened in young children.

Creativity Enhancements

There are various ways to build creativity in children at a young age. Cho and Kim (1999) found that picture books increased creativity in a Korean kindergarten

classroom of 20 children. After the children read a picture book they created projects, crafts, and science experiments based on the book. The authors concluded that the picture book helped the children to veer from conventional ways of thinking and use their imaginations. They also concluded that teacher guidance and encouragement of creative thinking is essential (Cho & Kim, 1999, p. 341; Chronopoulou & Riga, 2012; Dowdell, Gray, & Malone, 2011, p. 33).

Fantasy play, or pretend play, has also been found to boost creativity. Russ and Wallace (2013) discussed how "pretend play constitutes an open-ended event and serves as a tool that a child uses for a variety of creative purposes" (p. 136). David Elkind (2007) wrote that imagination and fantasy need to be exercised to be fully developed (p. 15). In a longitudinal study, Russ, Robins, and Christiano found that children's use of imagination predicted divergent thinking four years later (Russ & Wallace, 2013, p. 141). Similarly, Wallace found that children engaged in pretend play anticipated divergent thinking over a four-year time frame (Russ & Wallace, 2013, p. 141). Considering these findings, one can see how adults need to cultivate imaginative fantasy play to contribute to a child's growing creativity levels.

Adults can also assist in a child's creative development by supplying 'loose parts' (Beloglovsky & Daly, 2015). Loose parts, or open-ended materials, are an incredibly vast assortment of objects that expand a child's creativity. Loose parts can be simple items such as sticks, rocks, buttons, cotton balls, beads, popsicle sticks, or anything else a child can manipulate. Children are free to build, paint, glue, piece together, sort, collect, order, and play with these objects. In an article by Drew and Rankin (2004), they discussed how "play and the creative arts in early childhood programs are essential ways

children communicate, think, feel, and express themselves" (p. 44). It is this freedom with various objects, and no direction, which allow children to think differently and create exceptional, unique artwork and structures.

A study in the United Kingdom supplemented loose parts to the children's play and found that the materials increased collaboration, communication, and problem-solving skills (Beloglovsky & Daly, 2015). One of the lead researchers on creativity, Ellis Paul Torrance, believed that creativity was at its maximum potential when people collaborate (Rogers & Taylor, 2001). Through shared brainstorming and learning children can combine ideas to more complex levels. When children have the ability to manipulate loose parts as a team one can see the potential for creative growth (Beloglovsky & Daly, 2015; Drew & Rankin, 2004; Rogers & Taylor, 2001).

In a 2012 study, the effects of movement and music were measured in preschool children. Using creativity tests, observation plans, and interviews the children were judged on originality, elaboration, fluency, and flexibility (Chronopoulou & Riga, 2012). A control group of 18 children were studied alongside an experimental group of 15 children. Movement, singing, instruments, active listening, and music reading and writing were used on the experimental group (Chronopoulou & Riga, 2012). There was significant growth in creative behavior in the experimental group. The study concluded that intervention can expand on a child's creativity; however, the teacher is key to unlocking each child's unique creative interests (Cho & Kim, 1999, p. 341; Chronopoulou & Riga, 2012; Dowdell et al., 2011, p. 33).

It is interesting to note that the use of movement was one of the factors in the previous study which led to creative behavior in young children. Purposeful movement is

tied to neurological changes and fundamental processes of mental development (Lillard, 2007, p. 44). In one study, movement that aligned with what was being learned led to better learning rather than just watching (Lillard, 2007, p.44). One can speculate that movement associated with creative learning could lead to stronger, more enhanced, creative behaviors. For example, if children were acting out a story, instead of just listening to it, creative thinking could possibly increase. Stevens-Smith (2004) pointed out, "The greater the movement and stimulation, the greater the number of synaptic nerves interconnections, and therefore, the greater capacity to learn" (p. 10). Lillard and Stevens-Smith present strong evidence for movement to strengthen creative learning.

Another important variable in increasing creativity is the level of engagement, or flow. When an individual is in a state of flow, or deeply involved in enjoyable activities, creativity has been shown to increase (Bryne, MacDonald, & Carlton, 2003). In a study by Byrne, MacDonald, and Carlton (2003) flow was used to assess creativity in musical compositions. "A significant correlation was found between optimal experience or flow levels of students and the quality of their group compositions as measured by creativity ratings" (Bryne et al., 2003, p. 277). Intrinsic motivation is at the core of the flow theory. When children are experiencing flow, one could see the potential for divergent thinking, using their intrinsic thoughts and discoveries. Rogers and Taylor wrote that "intrinsic motivation promotes children's artistic creativity" (2001, p. 46). Based on these findings, children would need to be intrinsically interested in an activity for creativity to be increased.

Nature-based play has also been shown to increase creativity in children by increasing their imagination. Previously discussed was the value of imaginative, or

pretend, play on enhanced creativity. In a 2011 study, researchers Dowdell, Gray, and Malone compared the behavior of 2-6 year-olds in two early childhood settings. One was located in a warehouse with a complete artificial environment, whereas the other was an outdoor environment with the focus on a natural habitat. Over twelve weeks, behavior was monitored by behavior observations. The children in the natural outdoor space had higher incidents of imaginative play. This study's conclusion remains consistent with findings that "natural environments provide a rich setting for children's imagination and fantasy" (Dowdell et al., 2011, p. 32). Because imaginative play occurs so prevalently in a natural outdoor setting, a child's creativity level can be greater outdoors. Lester and Maudsley (2007) added that creative and constructive play is increased in the natural environment with the addition of 'loose parts', or open-ended materials, and the lack of hovering adult supervision (p. 26).

With children immersed in a natural, outdoor environment and given the opportunity to manipulate loose parts, move, run, collaborate, problem-solve, create, and engage in imaginative play, there is strong belief that children's creativity and skills of divergent thinking would only increase. Because these various elements have been shown to improve imagination and creativity, when combined, perhaps creative behavior would increase further. The studies also mention the positive impact of teacher or adult encouragement to aid in creative development.

Creativity Assessments

The Torrance Test of Creative Thinking is one of the most widely used scales to judge creativity levels. Scores on the Torrance Test predict creative thinking better than any other tests on creative and divergent thinking (Kim, 2011, p. 285). Kim used the

Torrance Test to determine findings that creativity in America is declining. There are both verbal (Thinking Creatively with Pictures) and nonverbal (Thinking Creatively with Words) areas within the test (Cropley, 2000, p. 73). Mental characteristics such as flexibility, fluency, originality, elaboration, abstractness of titles, and resistance to premature closure are all evaluated (Cropley, 2000, p. 73).

The Test for Creative Thinking-Drawing Production is a test developed to show a holistic idea of creativity (Urban, 2005, p.272). The subject assessed must complete a drawn picture around a figural form. The drawing is judged on 14 different factors such as breaking away from two-dimensionality and connections made between one form to another (Urban, 2005, p. 274). Urban (2005) also created an assessment list for children 4 – 8 years old based on their cognitive development of creativity (p. 278). It is clear that because young children are on different developmental planes, it's important to consider their stage of creative development before a proper assessment can be conducted.

Various studies have validated the Test for Creative Thinking-Drawing Production. In a study with four groups of seventh graders, the test correctly identified students with high creative potential and unconventional thinking (Urban, 2005, p. 275). In another study, a group of musicians and a group of scientific technical professionals took the test. The results showed that creativity levels in the musicians towered over the creativity of the scientific professionals group (Urban, 2005, p. 277). "The test manual reports correlations up to .82 with teacher ratings of creativity" (Cropley, 2000, p. 74). When studying adult career paths, the test scores distinguished between adults who lead creative careers versus those who did not (Cropley, 2005, p. 74). It is interesting to add

that this test found zero correlation between high levels of creativity and high levels of academic success (Cropley, 2000, p. 74).

The Creative Classification System is another form of assessment, which has "demonstrated its utility in predicting creative productivity in students who participate in enrichment programs and can be used to identify highly creative youth" (Kirschenbaum, 1998, p. 20). The Creative Classification System is based upon contact, conscience, interest, fantasy, incubation, creative contact, inspiration, production, and verification (Kirschenbaum, 1998, p. 21). These nine traits are the foundation upon which children can be assessed using various listed methods. Kirschenbaum (1998) recommended a teacher rating scale, Torrence Test, short personality scale, construction activity, portfolios, art, and observation for a comprehensive overview of a child's creativity (p. 25).

All of these widely used creativity tests judge on similar behaviors such as divergent thinking, imagination, flexibility, and originality. Although these tests have been shown reliable to test for creativity, it's clear that other methods of assessment must be calculated into the equation for a broad assessment.

Conclusions

Building upon creativity in young children has been shown possible through many avenues. Nature-based outdoor play, open-ended materials, collaboration, fantasy play, and movement have all been shown to increase creative thinking. Assessing creativity is a task that must consolidate various forms of data as to evaluate fairly and most accurately. Fortunately, there are already derived tests one can use to assess creativity. While assessing, the teacher or adult must remember to separate creativity

from preconceived notions of intelligence. Focusing solely on creativity can allow the adult to see another side of the child being studied. Studying creativity in young children remains a challenge, but with the proper environment, assessment tools, and objectivity the task remains obtainable. Based on the research, it is probable that the addition of loose parts to a nature-based outdoor play yard would increase young children's creativity.

Description of the Research Methodology

The research began with approval from the parents of the children involved. Parents were given a consent form (Appendix A) detailing the research project. The form explained that I would add loose parts, or natural manipulatives, to the outdoor play yard as part of the regularly scheduled outdoor time. The form explained the various data collection methods that would be used. The benefits of natural play and loose parts were also mentioned. Parents were told that if they wanted to opt out of the research, they needed to sign the form and return it within one week. No consent forms were sent back, so all 13 children were included in the research.

Observations collected during this research were conducted between the hours of 8:30am and 11:00am. This time slot is when the children had their morning work period. In the Montessori curriculum, this is the time when children are given uninterrupted time to choose work freely and receive lessons on various materials by the teacher. They are free to work independently, work in groups, or watch a friend work.

Before the addition of loose parts was added to the play yard, it was important to gain a solid baseline of data. The baseline observation stage lasted two weeks. There was nothing different or changed during the routine classroom time in these two weeks.

This baseline data allowed me to see if there was any increase in creativity from the beginning to the end of the research.

On the first day of research, I asked the children to complete the Test for Creative Thinking-Drawing Production (Appendix B). I used the language, "Please draw a picture on this sheet of paper. You may use the lines within your picture." No further instructions were given. This first Test for Creative Thinking-Drawing Production served as a baseline before any of the intervention began. A rubric (Appendix C) was used to score the test.

During the morning work period, two observations were conducted. The Observational Tally Sheet of Creative Behavior (Appendix D) was recorded for 15-minute intervals three times a week. The creative behaviors recorded were curiosity, flexible thinking, interest, imagination, visionary belief, inspirational ideas, focus, and high personal standards. I tallied the amount of times I saw the above behaviors in a 15-minute time frame. This tally sheet was consistently used during the two-week baseline study and after the intervention for three weeks.

The Observation of Intense Involvement and Enjoyment of Activity, or Flow (Appendix E), was recorded for 20-minute intervals three times a week. The activity and the length of time the activity was enjoyed were both recorded. These observations were also done during the two-week baseline study and after the intervention for three weeks.

Observations of spontaneous collaborative play in the outdoor play yard were observed during the two-week baseline time and the three-week time after intervention. I planned to observe two times per week for 30-minute intervals. After the two-week baseline stage, I determined that this was not enough time to observe collaborative

behavior. The children were so sporadic with collaborative behavior outdoors that I needed to observe more frequently. After the intervention, I increased the observations to three-four times per week for 30-minute intervals.

Also during the baseline stage, samples of artwork and writing works were collected to evaluate if there was a change in creative drawing and creative writing. Rubrics (Appendix G, Appendix H) were constructed to assess work as fairly as possible. Because children are free to choose drawing and writing work in the Montessori classroom, I had to ask children if I could make copies of their work whenever I saw a drawing or writing sample.

Photographs (Appendix J) of the loose parts were taken before the children were given the chance to use them. These photographs served as a visual reference to understand the exact materials that were added, and the location where they were located in the play yard. Photographs were also taken midway through the intervention when steps were taken to move the loose parts to a different location. Also midway through the intervention, photographs were taken of the newly added loose parts.

After the two-week baseline data stage concluded, the loose parts were added to the outdoor play yard. The loose parts consisted of wooden planks approximately two feet long by two inches wide. These planks were easily carried and moved by the children. Large rocks were added which were too heavy for the children to move, but could still be used in imaginative play. A large stump was added which was also too heavy for the children to move. Small tree discs approximately 10 inches in circumference were placed next to the rocks and stump. These discs were lightweight and could be moved by the children. A large balance beam made from a tree trunk was

added that was too heavy to be moved, but again could serve as a piece for imaginative play. Sticks, leaves, and grass were already located in the play yard and available for use as loose parts. A long wooden table was placed near the loose parts for the children to use. On the wooden table was a bucket of pinecones and a bucket of acorns that the children were free to use.

All of the loose parts were placed in the back of the play yard. They were not placed near the structured swing set. The back of the play yard has a few trees and is a more private area than the open swing set area. I felt that the privacy and woodsy setting would give the children the freedom to feel comfortable to explore the loose parts as well as collaborate without the feeling that a teacher was vigilantly watching them.

There was also no instruction as to what to do with the loose parts in order to observe originality and divergent thinking. When a child asked, "What are these for?" the response was, "To play with and use with your imagination." The only instruction was that the sticks and small wooden planks were not to be used for swords or to be swung around. The children were also instructed that they could not run with the sticks or small wooden planks for safety issues.

The second week after the loose parts were introduced, I completed a questionnaire (Appendix I) with each of the children. Since most of the children were too young to write their own answers, I narrated the questions and asked them which response they would choose. The answers to three of the questions were in a picture format of smiley faces. They ranged from very happy to very sad or angry. This gave the children a visual to answer the questions. I circled their responses after they pointed to the chosen smiley face. The last two questions were open-ended and I wrote down the

children's answer for them. The children completed the questionnaire at the end of week two after the loose parts were introduced. This gave the children enough time to be able to have sufficient time with the loose parts.

One week after the loose parts were introduced, I reflected on the status of the research project. The children used the loose parts on the first day they were introduced in creative, imaginative ways. After day one, the manipulatives were almost not touched the rest of the week. To benefit my research, I decided that I needed to change two factors. On week two of the intervention, I moved the loose parts from the back of the play yard closer to the main swing set. The loose parts were now closer to the open area of the play yard and not tucked away in the private, woodsy area. I also decided to add more loose parts to regain excitement and interest. Also during week two of the intervention, small buckets, pans, spoons, more acorns, and water in a pitcher were added.

On the last week of the research project, the children were again given the Test for Creative-Thinking Drawing Production (Appendix C) to compare any change from the first rendition. As mentioned earlier, I also narrated the questionnaire (Appendix I) to the children again during the last week.

Analysis of the Data

Data collected was analyzed to determine the impact of the addition of loose parts on creativity. Observations and evaluations of happiness, collaboration, concentration (engagement) resulting from a state of "flow", and creativity in drawings and writings were analyzed, leading to the following conclusions.

The first data piece collected was the observational tally sheet of intense involvement and enjoyment in activity, resulting from being in a state of flow. The number of students engaged during the same twenty-minute time period each day was recorded in the classroom during the morning work period (Figure 1). One observation in week four did not take place due to a holiday when there was no school. Also, child G was not able to be included in these observations since the child was not at school during the morning work periods.

The data collection of engagement in activity (or state of flow) (Figure 1) showed no change after the intervention took place on October 5th. There appeared to be little connection between the addition of the loose parts outdoors and intense engagement in activity inside the classroom.

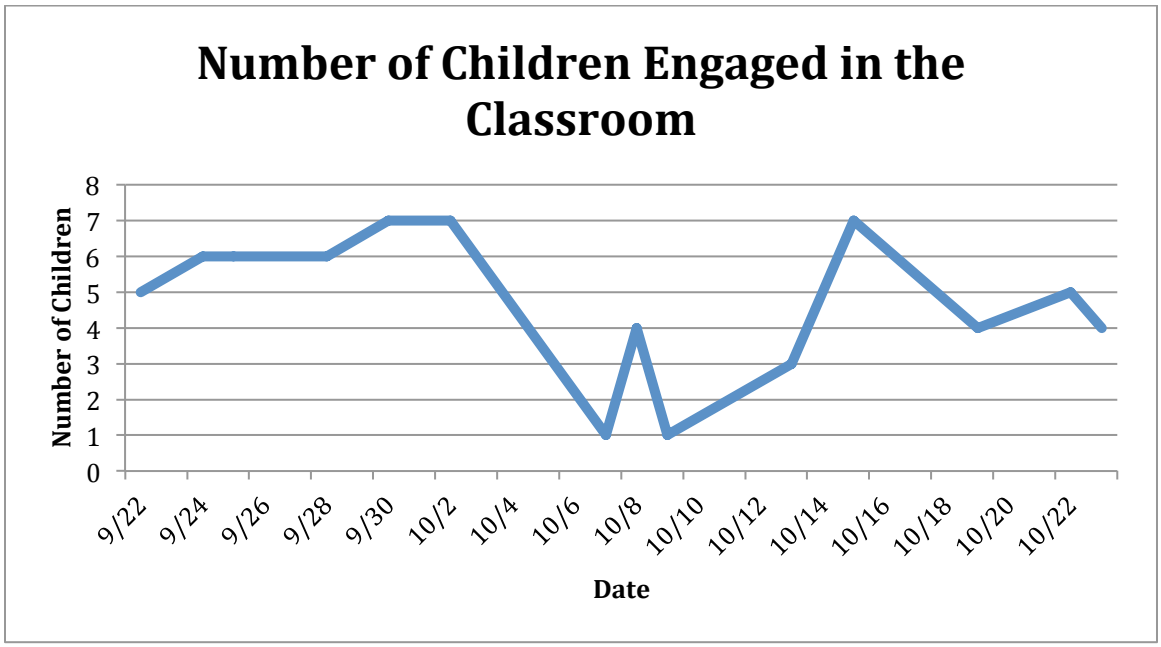

Figure 1: Number of Children Engaged in Activity (concentrating) inside the Classroom during a 20-minute period three times a week during the morning work period. Loose parts were added October 5th.

Figure 2 shows that the total time the children were engaged during the first two days of data collection, before the implementation of the intervention, was significantly

less than engagement time during the last two days of the data collection. Data was collected three times a week for intervals of 20 minutes during the morning work period inside the classroom. The first two observations and the last two observations were used to compare the first week's results to the last week's results (Figure 2). Therefore there is some evidence that overall engagement or concentration was affected positively during the research period. Even though the number of children that were engaged did not increase (Figure 1), the amount of time during which children were engaged increased (Figure 2), thus representing a greater classroom atmosphere of engagement after the intervention.

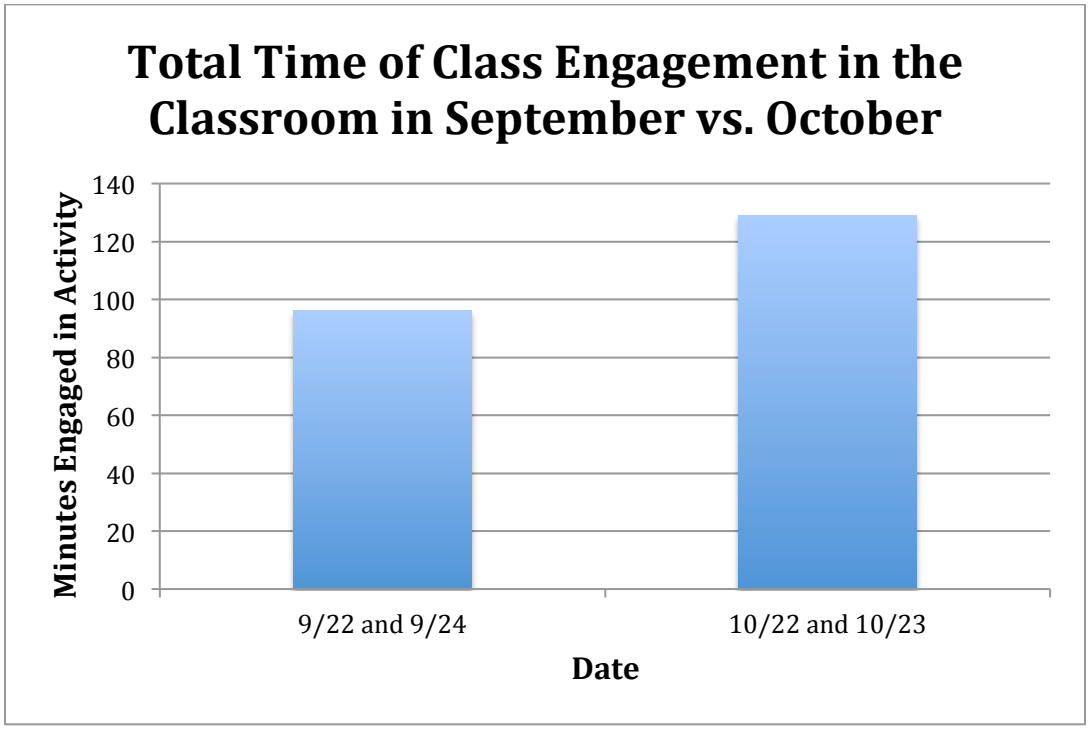

Figure 2: Total Time of Class Engagement inside the Classroom in September vs. October

Spontaneous collaborative play in the outdoor play yard was observed as a baseline before and after the intervention (Figure 3). The loose parts were added to the play yard on October 5th. Before this time, it was clear that spontaneous collaborative

play was low. Once the loose parts were added, spontaneous collaboration involving the manipulatives skyrocketed, but only for that one day. Because the loose parts were not being used, I added more manipulatives to the play yard on October 13th and 14th and this was the time when collaboration with loose parts was the highest. Although on the last day of the research none of the students used the loose parts, spontaneous collaboration still continued through running, games, and playground play.

Spontaneous collaborative play increased as a whole throughout the time the loose parts were in the play yard (Figure 3, Figure 4). On the last day of observation, the children collaborated the most out of any day previously. The majority of the collaborative play with the loose parts involved make-believe games. The children imaginatively made acorn soup, built traps to catch insects, constructed fires, and created an obstacle course. As an unexpected outcome, through observing collaboration I was able to witness an increase in imaginative play when the loose parts were added.

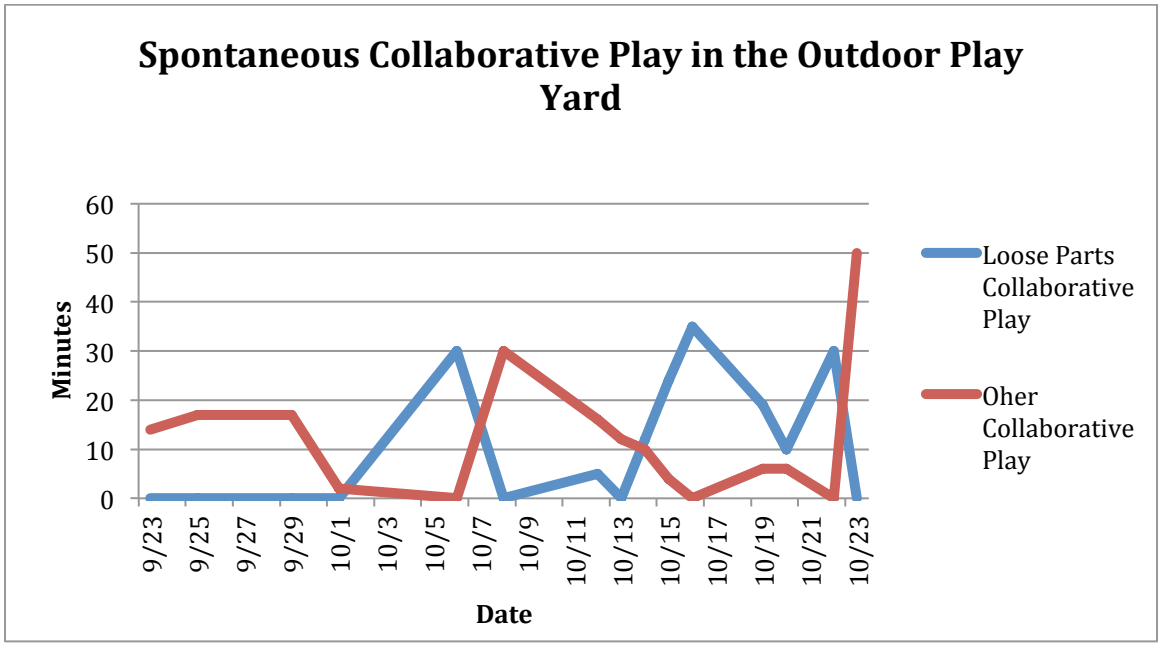

Figure 3: Spontaneous Collaborative Play in the Outdoor Play Yard

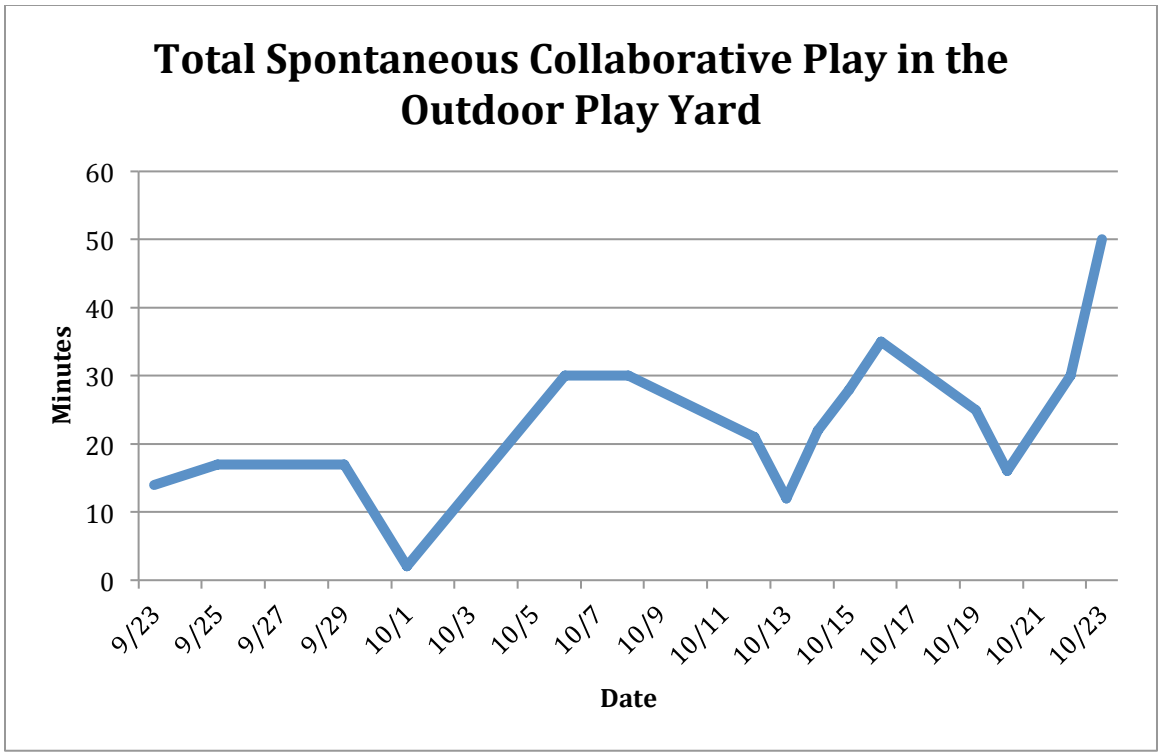

Figure 4: Spontaneous Collaborative Play in the Outdoor Play Yard including loose parts and other collaborative play

On week two, I asked the children questions (Appendix I), which drawing described their feelings about the outdoor play materials. The purpose for the questionnaire was to gauge the level of happiness the outdoor materials, mainly the loose parts, brought to the children. The level of happiness, connected to intense engagement, would be a possible indicator of increased creativity.

Figure 5 indicates the results of the students' responses. Two of the 14 children in the study did not take part in the questionnaire, as they did not want to answer any questions. All of the students who took part in the survey (12) responded with the highest answer in response to the question, "How do you like the things you have to play with outside?" All children pointed to the happy smiley face for this question. The second question, "Do you like doing the activities alone?" was similar in that the overwhelming majority of 11 students chose that they did not like doing activities alone.

One student chose the sad face, which most likely meant that most of the time the student did not like working alone, but occasionally would. The last question with the smiley face answers was, "Do you like doing the activities with a friend?" and all twelve of the students chose the happy face which meant that they all prefer and enjoy working with a friend. The researcher deduces from these responses to the multiple-choice questions that the children all enjoy playing as a collaborative group. They all prefer to play with friends outside rather than alone, and even when asked if they like to work alone, all of the children responded negatively. These results show a high level of happiness when the children are in the outdoor play yard. However, it is unclear if this happiness is due to the addition of loose parts, or due to the positive benefits of outdoor collaborative play.

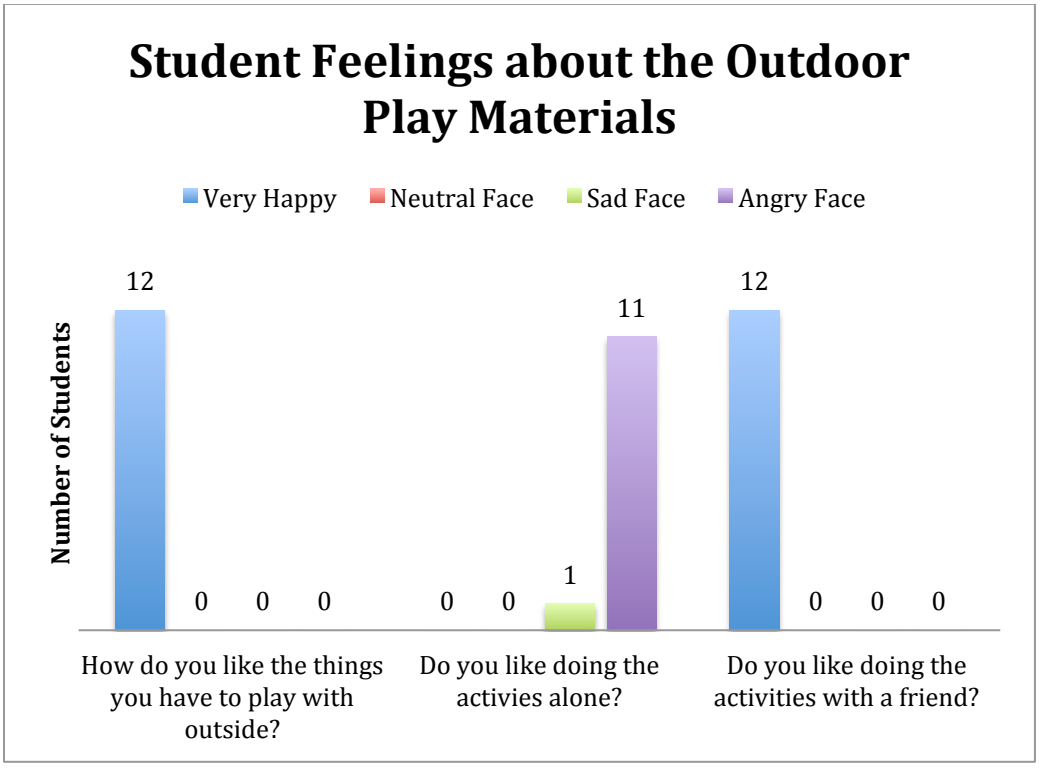

Figure 5: Student Feelings about the Outdoor Play Materials

Figure 6 represents data that is an extension of the data in Figure 5, but instead of the multiple-choice questions, the children were asked two open-ended questions. First,

the twelve children were asked what their favorite things were to play with outside. Six of the children said the swing set, four of the children said games such as tag, and two of the children had answers relating to the loose parts. Students were also asked what their least favorite things to play with outside were. Most of the children responded with answers not relating to the question. For example, two children responded, "When I get hurt." Three children said they didn't like the swing set and three said they didn't like games. One child said there was nothing she didn't like outside.

The results display a varied interest in the many choices to play with outside (Figure 6). Two children out of 12 said that the loose parts were their favorite things to play with outside, while none said it was their least favorite. The swing set stood out as the most favored item outside, but it is also the largest, most noticeable, and has been in place the longest which may have been a factor in the choice. At the time of the questionnaire, the loose parts had been in the play yard for about a week and a half, which may have not been sufficient time for all of the children to notice them as their favorite play material outdoors.

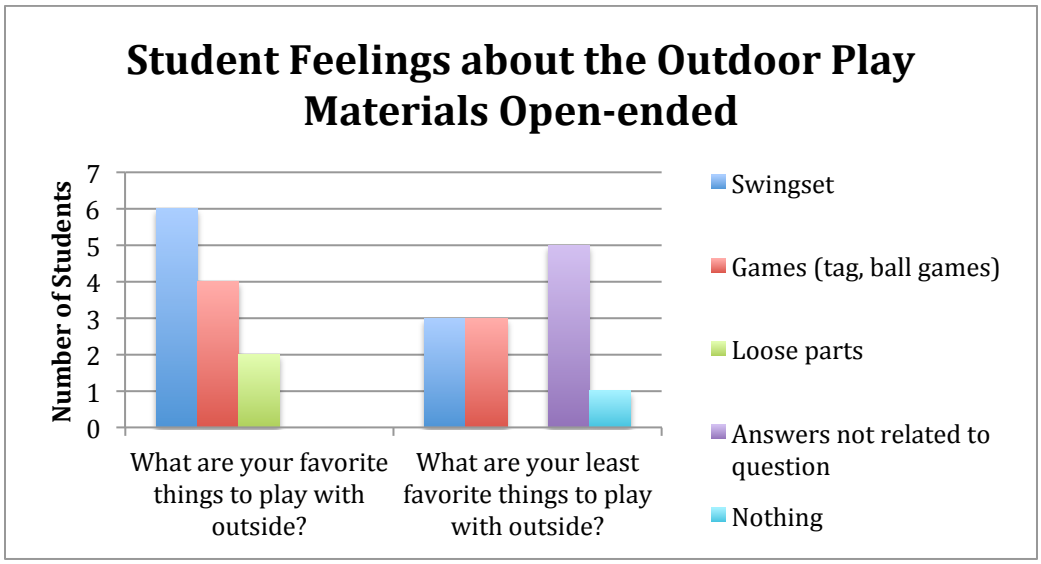

Figure 6: Student Feelings about the Outdoor Play Materials Open-ended

Creative behaviors were observed at 15-minute intervals three times per week, which may have not been enough time to gain a true result. Because children were free to choose work for two and a half hours during the morning work period, their creative behaviors were changing throughout those two and a half hours. It may be possible that there were no consistent findings because of this short amount of time.

Although imaginative play increased outdoors when the children were observed, there were no findings that fantasy and imagination increased when working in the classroom, which could have led to an increase in creativity. This may be due to the discouragement of imaginative play with the Montessori materials during the morning work period. The children may feel as though they are freer to exhibit fantasy play outdoors.

The next piece of data analyzed was the Test for Creative Thinking-Drawing Production. A rubric was used to rate the creativity before the intervention and after the intervention. The rubric was rated fair, good, very good, and excellent based on various creative indicators. Figure 7 shows the results from week 1 in blue before the loose parts were added to the play yard. Figure 7 also shows the results in red from week 5, which was the last week of the research.

Creativity shown from the Test for Creative Thinking-Drawing Production had slightly increased over the 5 weeks of research (Figure 7). This could be due to a multiple of factors. The children had seen this paper before so perhaps they had more time to think of creative ways to draw the test. Because there was 5 weeks of research in between the first and second test, the children had grown slightly in age and thus perhaps leading to more complex and creative pictures.

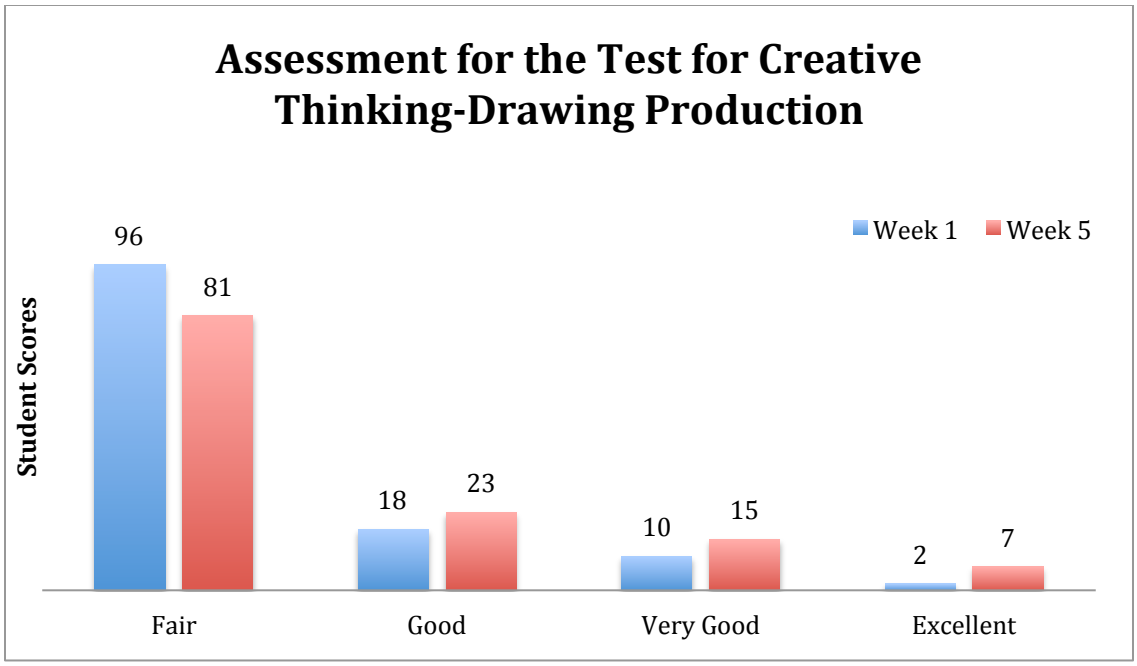

Figure 7: Assessment for the Test for Creative Thinking-Drawing Production

Samples of artwork and writing were collected throughout the five weeks and evaluated using rubrics. The findings of creative writing and artwork are shown in Figure 8 and Figure 9. The mean, median, and mode were calculated for the class as a whole and the mean slightly increased (Figure 8). However, it does not amount to enough to say that a significant increase in creative writing occurred. It appears to have stayed the same. The median and mode did increase, which points to higher scores for some of the children, but not the class as a whole.

There was a slight increase within the mean, median, and mode for grading of artwork (Figure 9). It is too insignificant to conclude there was a rise in creative artwork, but there is a possibility. Also, as mentioned earlier, the children had been drawing for 5 weeks so there is a chance that their artwork became more creative as they grew more advanced.

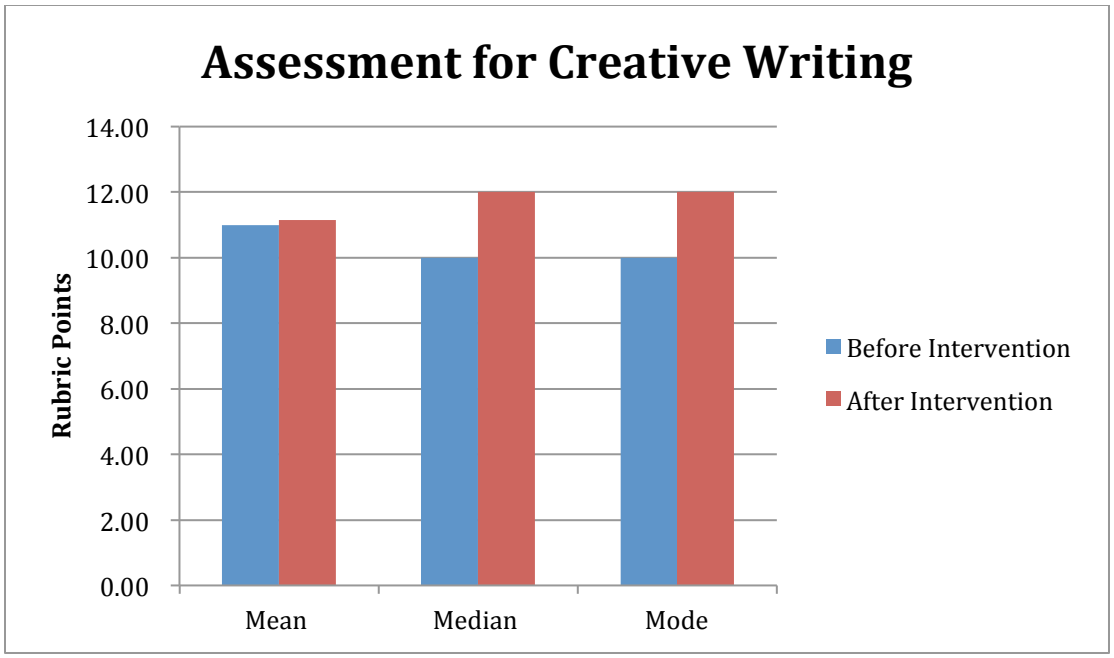

Figure 8: Assessment for Creative Writing

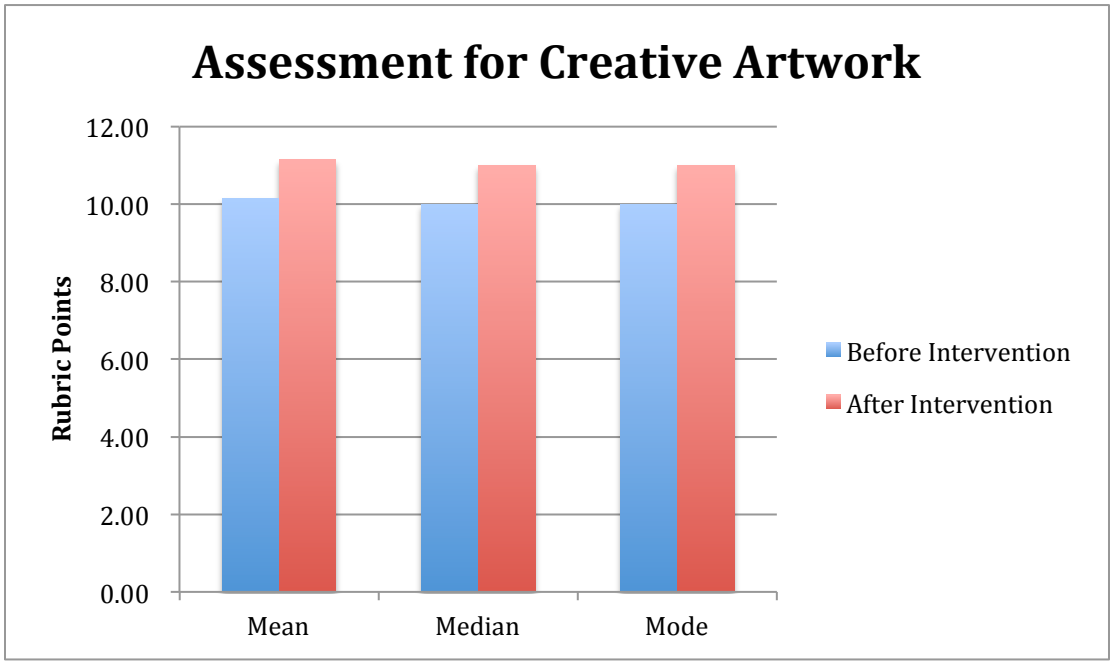

Figure 9: Assessment for Creative Artwork

Action Plan

The purpose of this research project was to evaluate the effects on creativity in the classroom when loose parts were added to the outdoor play yard. Increased engagement

and concentration (state of flow) in the classroom was also a goal of this research as concentration (state of flow) it is linked to increased creativity. There was a slight rise in concentration time in the classroom from the first week of the study compared to the last week. This suggests that the loose parts may have contributed to the increase in engagement and concentration (state of flow). Through classroom observation and other data tools, it appeared that creativity in the classroom had not increased. Although there was no significant impact on creativity, there are other elements, such as collaborative play, that were affected positively from the addition of the outdoor manipulatives.

The most significant finding from this research was that outdoor collaboration increased once the intervention began. The children were seen working together outdoors in various ways with the loose parts. Once the excitement wore off, they did not gravitate towards the loose parts and collaboration decreased. It seemed that the loose parts needed to be varied for the children to be attracted to them. It was also important that the children had easy access to objects for transporting the loose parts (i.e. buckets, cups, pots) in order to use them collaboratively. Without those methods of transportation, the children did not work with the loose parts as much as they did when those methods were added.

The fact that the children grew tired of the loose parts after day one may have been because of the school's affluent population. The children in this particular school are exposed to many toys, games, and technologies at home. There is no shortage of material items. It would be interesting to conduct further research on the effect of loose parts on creativity in various school settings of differing demographics. Lower income children may not have as many material play items and perhaps would not grow tired of

the loose parts after one day. Conducting the research in a public school located in a lower income area could possibly result in different outcomes.

Conducting research on collaboration inside the classroom as a result of loose parts might be effective. Collaboration increased outdoors, but it is unclear if collaboration indoors increased since the focus indoors was on creativity. Collaboration is already an integral part of the Montessori classroom and it would be informative to witness if loose parts could in fact boost collaboration during the morning work period.

The loose parts also increased imaginative play outdoors. During the observations of collaboration, I witnessed the children creating many imaginative stories using the loose parts. The children were making up complex stories with the manipulatives being the key component. This type of complex imaginative play was not notably witnessed before the loose parts were added. I witnessed the children working out disagreements, bonding as friends, making new friends, and experimenting with different emotions during the imaginative games.

Further research could be helpful to understand the types of imaginative play that occur with the loose parts. Observing imaginative play could give educators a glimpse into a child's home life, as children act out scenarios they have been a part of in real life or have witnessed on television and movies. In this research, imaginative play was observed to a greater extent outdoors. Indoors, the children were observed occasionally using the Montessori materials in imaginative ways, but not nearly as much as outdoors. This is most likely due to the fact that the children knew the materials were supposed to be used in a specific, purposeful way.

While the children were engaging with the loose parts imaginatively, they were also seen expressing joy. The interview conducted with the children halfway through the research confirmed that they all enjoyed the items they had to play with outdoors. As an educator, it is important that the children are happy in their environment. The loose parts are another tool that the children are free to use outside contributing to joyful learning

The results of this research study lead me to believe that creativity is developed to deeper levels as a child ages. The young three-year-olds were creative in imaginative play, but it was not evident through artwork or classroom behavior. The older five-year-old children were much easier to evaluate because they had more samples of creative writing, artwork, and the ability to invent stories verbally with the vocabulary necessary to do so. Further research on creativity may be more effective if ages are not intermixed since children are on such varied planes of development.

In this research, the children were given no direction with what to do with the loose parts. In the future, it may be helpful for educators to give slight direction and ideas for the children to build upon. The loose parts could also be used as a tool for very active children. The teacher could ask a child to move all of the loose parts from one area to another using a wheelbarrow or carrying the pieces. The teacher could also ask a group to build something specific so the children could work together to achieve one goal. There are many ways educators could decide to use loose parts, but because of the noted benefits, the manipulatives will continue to be used at the studied school.

Although this research did not lead me to conclude that loose parts outdoors led to an increase in children's creativity, the children still benefited from being involved in this study. The addition of loose parts was in the beginning of the school year, and I believe

the increased collaboration with the manipulatives allowed the children to get to know each other on a deeper level more quickly than they would have without them. I will continue to use loose parts in the outdoor play yard especially at the beginning of the school year. If educators are having issues with classmates connecting, loose parts can be a helpful addition to boost camaraderie.

I believe that the most important finding from this research is that loose parts can increase spontaneous collaborative play. Collaboration is such an integral skill needed for the successful creation of a peaceful society, where community members are working together, exchanging ideas, and solving problems. If educators can incorporate loose parts into the curriculum, then children can potentially unknowingly gain invaluable collaboration skills as they happily play with the loose parts.

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Appendix A

The Effects of Loose Parts and Nature-Based Play on Creativity in the Early Childhood (3-6 year old) Montessori Classroom

Assent Form

September 8, 2015

Dear Parents,

In addition to being your child's Primary teacher, I am a St. Catherine University (St. Kate's) student pursuing a Masters of Education. As a capstone to my program, I need to complete an Action Research project. I am going to study adding various manipulative materials (logs, sticks, rocks, tree stumps, etc.) to the outdoor play yard because I would like to learn more ways to evaluate the effects on creativity in the classroom.

In the coming weeks, I will be adding loose parts as a regular part of the scheduled outdoor play. All students will participate as members of the class. In order to understand the outcomes, I plan to analyze the results of this activity to determine any enhancement of creativity.

The purpose of this letter is to notify you of this research and to allow you the opportunity to exclude your child's data from my study. Data will include observational notes, creative behavior observation tally sheets, artwork assessment rubrics, creative thinking-drawing assessments, and observation of 'flow', or intrinsically satisfying engagement in an activity.

> **If you decide you want your child's data to be in my study,** you don't need to do anything at this point.
>
> **If you decide you do NOT want your child's data included in my study,** please note that on this form below and return it by September 15, 2015. Note that your child will still participate in the activity but his/her data will not be included in my analysis.

In order to help you make an informed decision, please note the following:

- I am working with a faculty member at St. Kate's and an advisor to complete this particular project.
- There are many proven benefits to outdoor play and manipulatives, which will both be used in this study. The addition of manipulative materials, or loose parts, has been shown in studies to boost collaboration, problem-solving skills, and creativity. The numerous benefits of free outdoor nature-based play including enhanced imagination, stress reduction, and physical and mental health benefits.
- I will be writing about the results that I get from this research. However, none of the writing that I do will include the name of this school, the names of any students, or any references that would make it possible to identify outcomes connected to a particular student. Other people will not know if your child is in my study.

- The final report of my study will be electronically available online at the St. Kate's library. The goal of sharing my research study is to help other teachers who are also trying to improve their teaching.
- There is no penalty for not having your child's data involved in the study, I will simply delete his or her responses from my data set.

If you have any questions, please feel free to contact me, (973) 978-3689. You may ask questions now, or if you have any questions later, you can ask me, or my advisor Sandra Wyner Andrew (swandrew@stkate.edu), who will be happy to answer them. If you have questions or concerns regarding the study, and would like to talk to someone other than the researcher(s), you may also contact Dr. John Schmitt, Chair of the St. Catherine University Institutional Review Board, at (651) 690-7739.

You may keep a copy of this form for your records.

_____ _____

Leah Yavuz Date

OPT OUT: Parents, in order to exclude your child's data from the study, please sign and return by Friday September 15, 2015

I do NOT want my child's data to be included in this study.

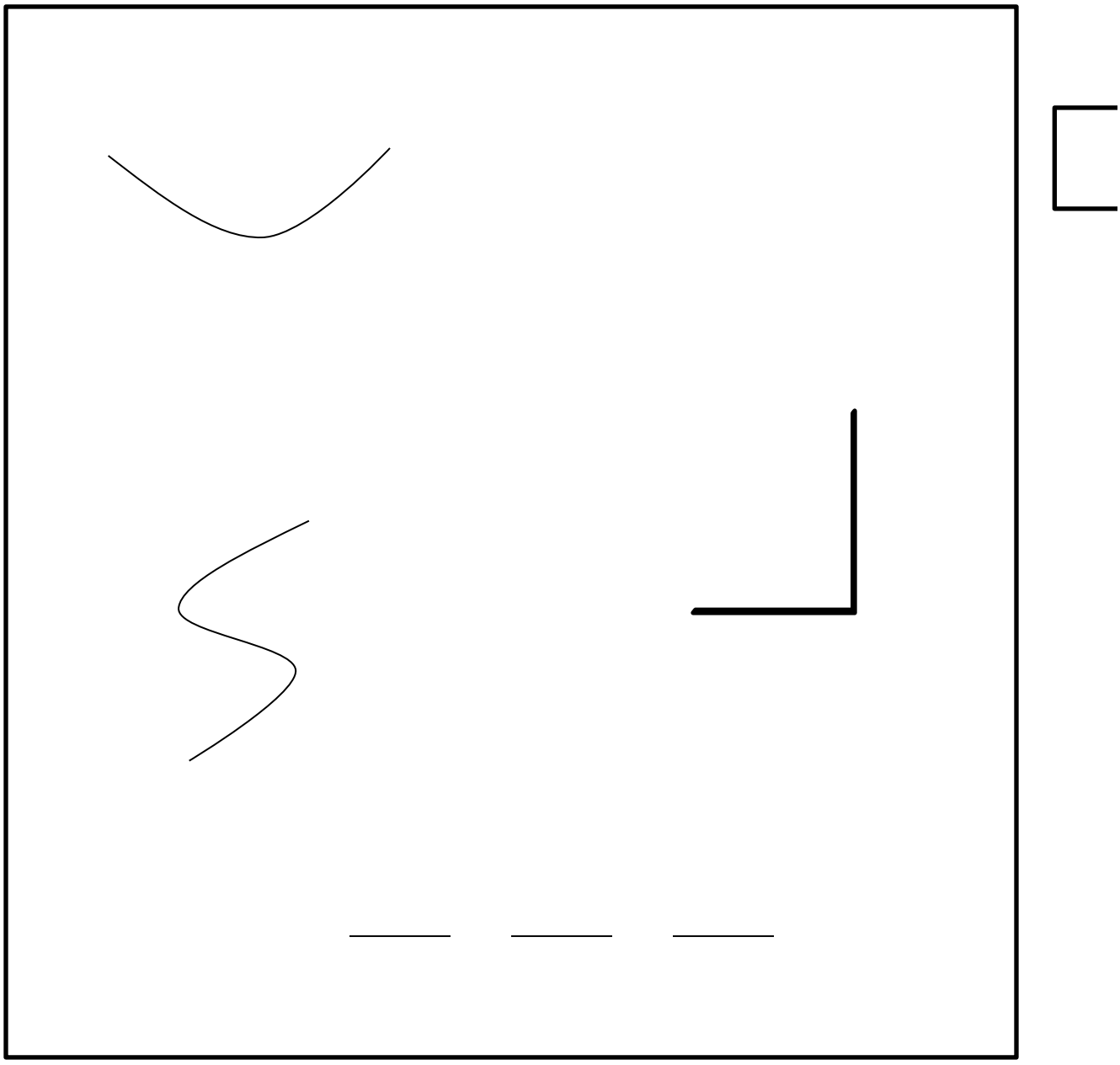
_____ _____

Signature of Parent Date

If you are not sure, please contact me to discuss.

Appendix B

Test for Creative Thinking-Drawing Production



Appendix C

Assessment for The Test for Creative Thinking–Drawing Production				
Evaluation Criteria	**Fair**	**Good**	**Very Good**	**Excellent**
Continuations: Continuation of the six given figural fragments				
Completion: Any additions, completions, supplements made to the figural fragments				
New elements: Any new figure, symbol, or element				
Connections made with a line: Between one figural fragment or figure to another				
Connections made to produce a theme				
Boundary breaking that is fragment dependent: Any use or extension of the "small open square" located outside the square frame				
Boundary breaking that is fragment independent				
Perspective: Breaking away from two-dimensionality				
Humor and affectivity: Drawing which elicits a humorous response, shows affection, emotion, strong expressive power				
Unconventionality: Any manipulation of the materials				
Unconventionality: Any surrealistic, fictional, and/or abstract elements or drawings				
Unconventionality: Usage of symbols or signs				
Unconventionality: Unconventional use of given fragments				
Speed: A breakdown of points, beyond a certain score-limit, according to the time spent on the drawing production				

Appendix D

Creative Behavior Observation Tally Sheet based on the Creativity Classification System (Kirschenbaum, 1998)

(note: before intervention and after)

Time Observed (15 minute intervals) _____

Date _____

Behavior	Frequency	Total
CONTACT – curious and open to experiences		
CONSCIENCE – flexible thinking, inquisitive, recognizes patterns		
INTEREST – flow, task commitment		
FANTASY – imaginative		
INCUBATION – multi–tasking, creative hobbies		
CREATIVE CONTACT – visionary, belief in paranormal activity		
INSPIRATION – seeks creative stimulation and new ideas		
PRODUCTION – stays focused for a long time		
VERIFICATION – high personal standards, assesses results		

Appendix E

Observational Tally Sheet of Intense Involvement and Enjoyment of Activity, or Flow

Date _____

Student	Activity	Begin time	End Time	Total Time Engaged in Flow

Appendix F

Observation of Spontaneous Collaborative Play in the Outdoor Play Yard

To be measured before intervention as a baseline and after intervention

2x per week for intervals of 30 minutes

Date _____

Time Begin	**Time End**	**Collaborative Behavior Observed**

Appendix G

Rubric for Assessing Creativity in Creative Writing based on nonverbal Torrance Test

Student _____

Date _____

Creative Strength	3	2	1	0
Fluency (relevancy of ideas, the number of ideas)	There are many ideas and objects in the writing that are related.	There are some ideas in the writing that are related	There are few ideas in the writing that are related	None of the ideas in the writing relate to each other
Originality (rarity)	Writing is completely original	Writing is somewhat original	Very little of the writing is original	The writing has no originality
Elaboration (amount of detail)	Writing is extremely detailed	Writing is somewhat detailed	Very few details are in the writing	The writing has no detail
Abstractness of Titles (how abstract ideas are, thinking beyond the obvious)	The writing is extremely abstract and beyond the obvious	Writing is somewhat absrtact and beyond the obvious	Writing displays very little abstract ideas	Writing has no abstract ideas and does not think outside of the obvious
Resistance to Premature Closure (open-mindedness)	Writing is very open-minded	Writing is somewhat open-minded	Writing displays little open-mindedness	Writing is not open-minded

Appendix H

Rubric for Assessing Creativity in Artwork based on nonverbal Torrance Test

Student _____

Date _____

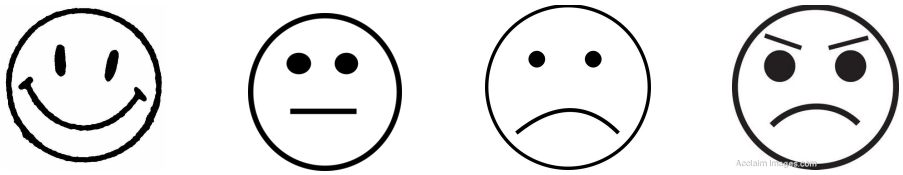
Creative Strength	3	2	1	0	Rating
Fluency (relevancy of ideas, the number of ideas)	There are many ideas and objects in the picture that are related.	There are some ideas in the picture that are related	There are few ideas in the picture that are related	None of the ideas in the picture relate to each other	
Originality (rarity)	Artwork is completely original	Artwork is somewhat original	Very little of the artwork is original	The artwork has no originality	
Elaboration (amount of detail)	Artwork is extremely detailed	Artwork is somewhat detailed	Very few details are in the artwork	The artwork has no detail	
Abstractness of Titles (how abstract ideas are, thinking beyond the obvious)	The artwork is extremely abstract and beyond the obvious	Artwork is somewhat absrtact and beyond the obvious	Artwork displays very little abstract ideas	Artwork has no abstract ideas and does not think outside of the obvious	
Resistance to Premature Closure (open-mindedness)	Artwork is very open-minded	Artwork is somewhat open-minded	Artwork displays little open-mindedness	Artwork is not open-minded	

Appendix I

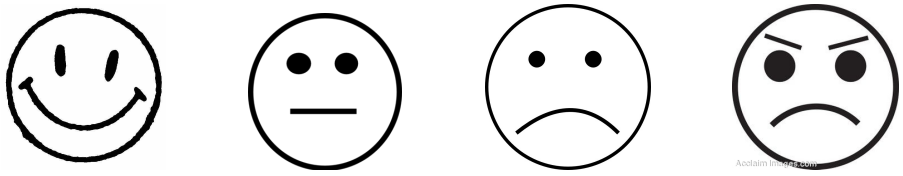
Student Feelings about The Outdoor Play Materials

Student:
Date:

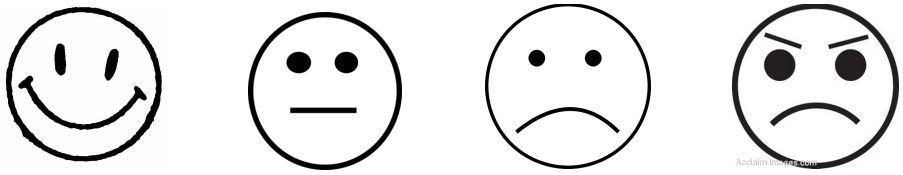
How do you like the things you have to play with when you are outside?



Do you like dong the activities alone?



Do you like doing the activities with a friend?



What are your favorite things to play with outside?

What are your least favorite things to play with outside?

Appendix J